Listing of the Claims

NOTE: The following listing is included for convenience of the reader; no claim amendments are presented herein.

1.   (Previously presented) A method of processing data received from a keyboard having a plurality of keys, the plurality of keys including multiple keys having respective characters assigned thereto, the plurality of keys further including one or more force-sensing keys, the method comprising:

receiving keyboard data sets reporting, for keys of the plurality pressed by a keyboard user, key force data and key identification data;

determining whether key force data in a keyboard data set updates key force data corresponding to a previously-reported key press for a key continuing to be pressed;

generating first type keyboard data messages containing force updates based on updated key force data, key identifiers for the keys associated with the updated key force data, and force update indicators;

generating second type keyboard data messages identifying initially pressed keys and forces applied to the initially pressed keys; and

automatically generating, at a repeat rate based on key force data for a key held pressed by a user, a third type keyboard data message indicating the held key has been pressed.

2.   (Original) The method of claim 1, wherein the first and second type keyboard data messages have a common data structure.

3.   (Original) The method of claim 1, further comprising:

determining if reported key force data contains a null indicator; and

associating a null indicator with a non-force-sensing key.

4.   (Original) The method of claim 3, wherein a null indicator is a zero value for key force data.

5.   (Original) The method of claim 1, wherein said receiving keyboard data sets comprises receiving a data set having key identification data and key force data for multiple keys, and further comprising:

    parsing the key identification data in the keyboard data set into an ordered list of key identifiers;

    parsing the key force data in the keyboard data set into an ordered list of key force values; and

    associating key identifiers and force values based on the orders in which the key identification data and the key force data appear in the data set.

6.   (Canceled)

7.   (Previously presented) The method of claim 1, wherein the first, second and third type keyboard data messages have a common data structure.

8.   (Previously presented) The method of claim 1, wherein said automatically generating a third type keyboard data message comprises mapping a repeat rate to the key force data for the held key.

9.   (Original) The method of claim 8, comprising:

    storing cumulative key force data; and

    based on the stored cumulative key force data, mapping a repeat rate to the force data for the held key.

10.   (Original) The method of claim 8, wherein said mapping is based on a transfer function
in which a range of force data values is subdivided into multiple sub-ranges, and wherein each of
the sub-ranges is assigned a repeat rate.

11.   (Previously presented) The method of claim 10, wherein the transfer function comprises
an initial group of sub-ranges mapped to gradually increasing repeat rate values followed by a
group of sub-ranges mapped to sharply increasing repeat rate values.

12.   (Previously presented) The method of claim 1, wherein said automatically generating a
third type keyboard message comprises:
        determining if a repeat invoke delay has elapsed since the user initially pressed the held
key; and
        commencing said automatic generation after the repeat invoke delay has elapsed.

13.   (Previously presented) The method of claim 1, further comprising:
        determining if the key force data for another held key contains a null indicator; and
        upon determining that the key force data for the other held key contains a null indicator,
automatically generating, at a preset rate and after a preset delay, repeating keyboard data
messages indicating the other held key has been pressed.

14.   (Original) A method of processing data received from a keyboard having a plurality of
keys, the plurality of keys including multiple keys having respective characters assigned thereto,
the plurality of keys further including one or more force-sensing keys, the method comprising:
        receiving a keyboard data set reporting, for multiple keys of the plurality pressed by a
keyboard user, key force data and key identification data;
        parsing the key identification data into an ordered list of key identifiers;
        parsing the key force data into an ordered list of key force values; and

associating key identifiers and force values based on the orders in which the key identification data and the key force data appear in the keyboard data set.

15.   (Original) The method of claim 14, further comprising:

determining if reported key force data contains a null indicator; and

associating a null indicator with a non-force-sensing key.

16.   (Original) The method of claim 15, wherein a null indicator is a zero value for key force data.

17.   (Previously presented) A method for processing data received from a keyboard having a plurality of keys, the plurality of keys including multiple keys having respective characters assigned thereto, the plurality of keys further including one or more force-sensing keys, the method comprising:

receiving a registration from a first application program requesting keyboard input data and key force data;

receiving a registration from a second application program requesting keyboard input data but not requesting key force data;

receiving keyboard data messages identifying keys that have been pressed by a user and containing force values for forces applied to the pressed keys;

generating a first keyboard input message identifying a first pressed key and containing the force value for the first pressed key; and

generating a second keyboard input message identifying a second pressed key and containing the force value for the second pressed key and a force update indicator.

18.   (Original) The method of claim 17, further comprising:

providing the first keyboard input message to the first and second applications.

19.   (Original) The method of claim 18, further comprising:

only providing the second keyboard input message to applications requesting key force data.

20.   (Original)   The method of claim 17, wherein the second keyboard input message is provided to the first application, and further comprising:

generating a third keyboard input message identifying a third pressed key and containing the force value for the third pressed key and a force update indicator; and

providing the third keyboard input message to the first application prior to providing a message indicating that the second pressed key is no longer being pressed.

21.   (Original) The method of claim 17, comprising:

storing the identifier for the last key identified as pressed;

storing the most recently received force value for the last key identified as pressed;

receiving a keyboard data message lacking a force value and indicating that the last key identified as pressed remains pressed; and

generating a keyboard input message identifying the last key identified as pressed and containing the stored force value.

22.   (Original) The method of claim 17, comprising:

receiving a simulated keyboard data message containing simulated key press data, the simulated key press data identifying an unpressed key and containing simulated key force data for the unpressed key; and

generating a third keyboard input message identifying the unpressed key, indicating a simulated key press, and containing the simulated key force value.

23.   (Previously presented)   A computer-readable medium having stored thereon data representing sequences of instructions which, when executed by a processor, cause the processor to perform steps comprising:

receiving keyboard data sets from a keyboard having a plurality of keys, the plurality of keys including multiple keys having respective characters assigned thereto, the plurality of keys further including one or more force-sensing keys, wherein the keyboard data sets report, for keys of the plurality pressed by a keyboard user, key force data and key identification data;

determining whether key force data in a keyboard data set updates key force data corresponding to a previously-reported key press for a key continuing to be pressed;

generating first type keyboard data messages containing force updates based on updated key force data, key identifiers for the keys associated with the updated key force data, and force update indicators;

generating second type keyboard data messages identifying initially pressed keys and forces applied to the initially pressed keys; and

automatically generating, at a repeat rate based on key force data for a key held pressed by a user, a third type keyboard data message indicating the held key has been pressed.

24.   (Original) The computer-readable medium of claim 23, wherein the first and second type keyboard data messages have a common data structure.

25.   (Original) The computer-readable medium of claim 23, comprising further instructions for performing steps comprising:

determining if reported key force data contains a null indicator; and

associating a null indicator with a non-force-sensing key.

26.   (Original) The computer-readable medium of claim 25, wherein a null indicator is a zero value for key force data.

27.   (Original) The computer-readable medium of claim 23, wherein said receiving keyboard data sets comprises receiving a data set having key identification data and key force data for multiple keys, and comprising further instructions for performing steps comprising:

parsing the key identification data in the keyboard data set into an ordered list of key identifiers;

parsing the key force data in the keyboard data set into an ordered list of key force values; and

associating key identifiers and force values based on the orders in which the key identification data and the key force data appear in the data set.

28.   (Canceled)

29.   (Previously presented) The computer-readable medium of claim 23, wherein the first, second and third type keyboard data messages have a common data structure.

30.   (Previously presented) The computer-readable medium of claim 23, wherein said automatically generating a third type keyboard data message comprises mapping a repeat rate to the key force data for the held key.

31.   (Original) The computer-readable medium of claim 30, comprising further instructions for performing steps comprising:

storing cumulative key force data; and

based on the stored cumulative key force data, mapping a repeat rate to the force data for the held key.

32.   (Original) The computer-readable medium of claim 30, wherein said mapping is based on a transfer function in which a range of force data values is subdivided into multiple sub-ranges, and wherein each of the sub-ranges is assigned a repeat rate.

33.   (Previously presented) The computer-readable medium of claim 32, wherein the transfer function comprises an initial group of sub-ranges mapped to gradually increasing repeat rate values followed by a group of sub-ranges mapped to sharply increasing repeat rate values.

34.   (Previously presented)   The computer-readable medium of claim 23, wherein said automatically generating a third type keyboard message comprises:

        determining if a repeat invoke delay has elapsed since the user initially pressed the held key; and

        commencing said automatic generation after the repeat invoke delay has elapsed.

35.   (Previously presented) The computer-readable medium of claim 23, comprising further instructions for performing steps comprising:

        determining if the key force data for another held key contains a null indicator; and

        upon determining that the key force data for the other held key contains a null indicator, automatically generating, at a preset rate and after a preset delay, repeating keyboard data messages indicating the other held key has been pressed.

36.   (Original)   A computer-readable medium having stored thereon data representing sequences of instructions which, when executed by a processor, cause the processor to perform steps comprising:

        receiving a keyboard data set from a keyboard having a plurality of keys, the plurality of keys including multiple keys having respective characters assigned thereto, the plurality of keys further including one or more force-sensing keys, wherein the keyboard data sets report, for multiple keys of the plurality pressed by a keyboard user, key force data and key identification data;

        parsing the key identification data into an ordered list of key identifiers;

        parsing the key force data into an ordered list of key force values; and

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associating key identifiers and force values based on the orders in which the key identification data and the key force data appear in the keyboard data set.

37.   (Original) The computer-readable medium of claim 36, comprising further instructions for performing steps comprising:

determining if reported key force data contains a null indicator; and

associating a null indicator with a non-force-sensing key.

38.   (Original) The computer-readable medium of claim 38, wherein a null indicator is a zero value for key force data.

39.   (Previously presented) A computer-readable medium having stored thereon data representing sequences of instructions which, when executed by a processor, cause the processor to perform steps comprising:

receiving a registration from a first application program requesting keyboard input data and key force data;

receiving a registration from a second application program requesting keyboard input data but not requesting key force data;

receiving keyboard data messages identifying keys that have been pressed by a user on a keyboard having a plurality of keys, the plurality of keys including multiple keys having respective characters assigned thereto, the plurality of keys further including one or more force-sensing keys, wherein the keyboard data messages contain force values for forces applied to the pressed keys;

generating a first keyboard input message identifying a first pressed key and containing the force value for the first pressed key; and

generating a second keyboard input message identifying a second pressed key and containing the force value for the second pressed key and a force update indicator.

40.   (Original) The computer-readable medium of claim 39, comprising further instructions for performing steps comprising:

    providing the first keyboard input message to the first and second applications.

41.   (Original) The computer-readable medium of claim 40, comprising further instructions for performing steps comprising:

    only providing the second keyboard input message to applications requesting key force data.

42.   (Original) The computer-readable medium of claim 39, wherein the second keyboard input message is provided to the first application, and comprising further instructions for performing steps comprising

    generating a third keyboard input message identifying a third pressed key and containing the force value for the third pressed key and a force update indicator; and

    providing the third keyboard input message to the first application prior to providing a message indicating that the second pressed key is no longer being pressed.

43.   (Original) The computer-readable medium of claim 39, comprising further instructions for performing steps comprising:

    storing the identifier for the last key identified as pressed;

    storing the most recently received force value for the last key identified as pressed;

    receiving a keyboard data message lacking a force value and indicating that the last key identified as pressed remains pressed; and

    generating a keyboard input message identifying the last key identified as pressed and containing the stored force value.

44.   (Original) The computer-readable medium of claim 39, comprising further instructions for performing steps comprising:

receiving a simulated keyboard data message containing simulated key press data, the simulated key press data identifying an unpressed key and containing simulated key force data for the unpressed key; and

generating a third keyboard input message identifying the unpressed key, indicating a simulated key press, and containing the simulated key force value.